

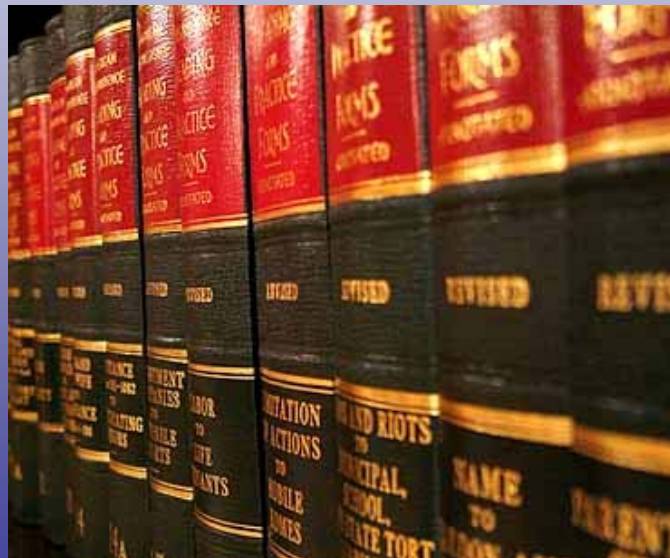
Part 4 Standards for Protection Against Radiation



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Topics

- Regulated activities
- Exposure
- Protection of the public
- Signs



Topics

- **Waste disposal**
- **Package handling**
- **Recordkeeping**
- **Incident reporting**
- **Vacating installations**



Regulated Activities

- **Registrants and licensees**
 - Receive, possess, use, transfer or dispose sources of radiation
- **except**
 - Background radiation, patient exposure, or voluntary participants in medical research programs



Exposure

- **Dose Limits**
 - 5 rem TEDE or 50 rem DDE + CDE organ or tissue (other than eye)
 - 15 rem lens of eye
 - 50 rem skin or extremity



Exposure

- **External**
 - **Monitoring Devices**
 - **Placement on the portion of the whole body receiving the highest dose**
 - **If an apron is worn, placement at collar**



Exposure

- **Internal**
 - **Measurements**
 - **Concentrations of airborne materials**
 - **Bioassays of radionuclides**
 - **Calculations**
 - **Require complex analysis**
 - **Tools available on-line (MIRD)**



Exposure

- **Medical fluoroscopists**
 - Special and interventional fluoroscopic procedures
 - Pre-approval required of written request for use of weighting factors
 - Must be accompanied by ALARA procedures
 - Dose determination 28-35-212c(2)



Exposure

- **Weighting factor considerations**
 - Only for low energy fluoroscopy, not nuclear medicine
 - Differentiation schemes for proposed dose from fluoroscopy and other occupational doses
 - Two sets of badges



Exposure

- **Respiratory Protection**
 - Engineering Controls
 - Other Controls
 - Access
 - Time
 - Respiratory protection equipment
 - NIOSH/MSHA certification
 - Application for authorized use



Exposure

- **TEDE-ALARA**

- Considerations of dose with respirator vs without respirator
- May be ALARA to not wear respirator
- Must be a known environment



Exposure

Respiratory Protection Program

- **Air sampling**
- **Surveys and bioassays**
- **Respirator testing**
- **Procedures**
- **Physician fitness determination**
- **Notification of intent - 30 days**



Protection of the Public

Dose cannot exceed

- **100 millirem in one year TEDE**
- **2 millirem in any one hour in any unrestricted area**

Surveys

- **Unrestricted areas**
- **Controlled areas**
- **Effluents released into unrestricted and controlled areas**
- **Medical release criteria in Part 6**



Historical Footnote

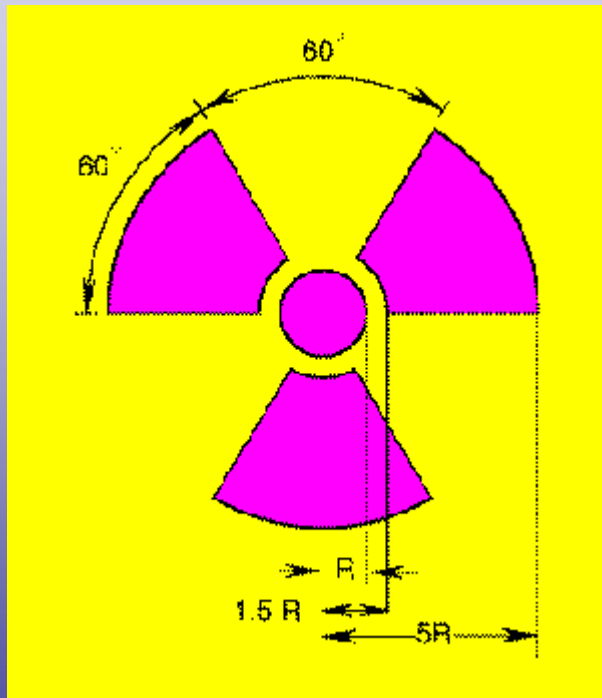


- Civil defense is for safety
- Radiation symbol is a warning



Radiation Area Signage

- **Protective Requirements**



Radiation Area Signage

- **Threshold for signage**



- **Radiation area**
 - 5 millirem in one hour at 30 cm
- **High radiation area**
 - 100 millirem in one hour at 30 cm
 - Healing arts X-ray not included
- **Very high radiation area**
 - 500 rad in one hour at one meter



Package Handling

Package Handling

- **Monitor**
 - Within 3 hours of receipt
 - Check limits with regulatory tables
 - Contact KDHE and carrier immediately if indicated by monitoring levels



Package Handling

- Procedures must be maintained for safely opening packages in which radioactive material is received



Waste Disposal

- **Transfer to an authorized recipient**
- **Disposal into sanitary sewage systems**
 - Soluble or dispersible in water at all conditions
 - Calculated not to exceed regulatory limits
 - Biofluids excreted from patients undergoing medical treatment are excluded from these limits
- **Public dose limits**
- **Decay in storage, must be on license**



Waste Disposal

- **Prohibited methods**
 - No burial in soil
 - No incineration



Waste Disposal

- **Waste classification**
 - **Class A waste – least rigorous**
 - **Class B waste**
 - **Class C waste**
 - **Waste that is not generally acceptable for near-surface disposal**



Waste Disposal

- **Waste packaging**
 - Most restrictive of site or state requirements
 - Not packed in cardboard or fiberboard
 - Liquids must have absorbent of 2x volume
 - Solid wastes must not have 1% by volume of liquid



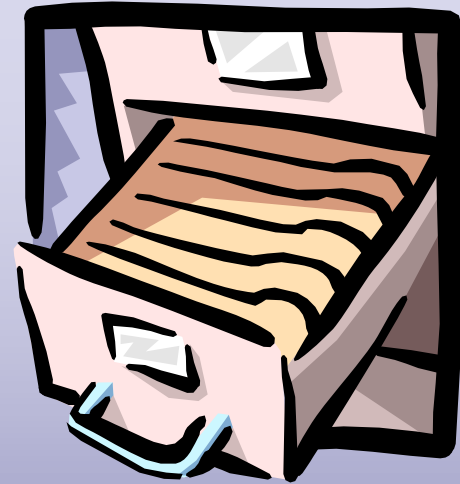
Waste Disposal

- **Waste packaging**
 - Not detonatable, explosive or water reactive
 - Not pyrophoric
 - Not over 1.5 atm for gasses
 - Total activity not greater than 100 curies per container
 - Biohazard waste shall be treated to reduce associated biohazards



Recordkeeping

- **Records that must be kept until termination of license or registration**
 - Provisions of the program
 - Surveys to determine dose
 - Respiratory protection surveys, bioassay and sampling
 - Radioactive effluent release measurements and calculations



Recordkeeping

- **Records that must be kept until termination of license or registration**
 - Prior occupational dose
 - Planned special exposures
 - Individual monitoring results
 - Dose to members of the public
 - Waste disposal



Recordkeeping

- **Records that must be kept three years from creation of record**
 - Audits
 - Area surveys
 - High radiation area entry control test results



Recordkeeping

- **Records that must be kept five years from the creation of the record**
 - **Sealed source leak test results**
- **Other requirements per specific Part**



Recordkeeping

- **Form of records**
 - Must be legible
 - May be authenticated copies of original
 - May be electronic media
 - Safeguards against tampering and loss



Incident Reporting

- **Report theft or loss of sources of radiation**
 - **Immediately by phone, telegraph, e-mail, or facsimile**
 - **Stolen, lost or missing licensed or registered material exceeding limits in regulations 28-35-228a**
 - 1000 times quantity in Appendix C
 - **Stolen, lost or missing radiation machine**
 - **Written report within 30 days**



Incident Reporting

- **Report theft or loss of sources of radiation**
 - In writing within 30 days if
 - Quantity still missing is greater than 10 times Appendix C
- **Report any substantive additional information on the theft or loss of source**
 - In writing within 30 days



Incident Reporting

- **What to include in the report**
 - Detailed description of what was lost
 - Circumstances
 - Disposition or probable disposition
 - Exposures
 - Actions taken and proposed to recover
 - Procedures to prevent recurrence



Incident Reporting

- **What to include in the report**
 - **Separate and detachable portion**
 - **Names of individuals who could have received exposure**



Incident Reporting

- **Notification of Incidents – Immediate**
Conditions exist that have or may cause
 - 25 rem TEDE or 75 rem eye dose
 - 250 rad shallow dose to skin or extremities
 - 24 hour exposure of 5 times ALI
 - Loss of one week of operations
 - Damage to property in excess of \$200,000



Incident Reporting

- **Notification of Incidents – 24 hour**
Conditions exist that have or may cause
 - 5 rem TEDE or 15 rem eye dose
 - 50 rem shallow dose to skin or extremities
 - 24 hour exposure of 1 time ALI
 - Loss of one day of operations
 - Damage to property in excess of \$2,000



Vacating Installations

- 30 days notice
- Decommissioning timeliness
- Financial assurance



Summary

Part 4

Standards for Protection Against Radiation

Find the regulations on the KDHE web site

<http://www.kdheks.gov/radiation/regs.html>

Questions about the Regulations?

Contact Bureau of Air and Radiation at

785-296-1560

